# CLAIMS

What is claimed is:

1. A method of manufacturing an axle tube housing for a differential assembly, the method comprising:

inserting a mandrel within a one-piece tubular blank;

applying an axial compression force to a first segment of said one-piece tubular blank;

applying a lateral compressing force to said first segment of said one-piece tubular blank to define a spindle section that closely conforms with at least one of a forging die and said mandrel; and

reducing a wall thickness of at least a portion of a second segment of said one-piece tubular blank to define a carrier section.

2. The method according to Claim 1, further comprising:

heating said first segment of said one-piece tubular blank prior to said deforming said first segment.

3. The method according to Claim 1, further comprising:

mounting a preformed plate to said one-piece tubular blank in a predetermined position, said preformed plate defining a final thickness prior to said mounting.

4. The method according to Claim 3 wherein said step of mounting a preformed plate to said one-piece tubular blank in said predetermined position comprises:

forming at least one hole through said preformed plate; and

fusion welding said preformed plate to said one-piece tubular blank following said forming said at least one hole.

5. The method according to Claim 1 wherein said deforming said first segment includes cold-forming.

6. The method according to Claim 1 wherein said deforming said first segment includes hot-forming.

7. A method of manufacturing an axle tube housing for a differential assembly, the method comprising:

heating a spindle segment of a one-piece tubular blank;

inserting a mandrel within said one-piece tubular blank;

deforming said spindle segment of said one-piece tubular blank;

applying a lateral compressing force to said spindle segment of said one-piece tubular blank to closely conform with at least one of a forging die and said mandrel; and

reducing a wall thickness of at least a portion of a carrier segment of said one-piece tubular blank.

8. The method according to Claim 7, further comprising:

mounting a pre-faced and drilled plate to said one-piece tubular blank in a predetermined position.

9. The method according to Claim 8 wherein said step of mounting said pre-faced and drilled plate to said one-piece tubular blank in said predetermined position includes fusion welding said pre-faced and drilled plate to said one-piece tubular blank.

10. The method according to Claim 7 wherein said deforming said spindle segment includes cold-forming.

11. The method according to Claim 7 wherein said deforming said spindle segment includes hot-forming.

12. A method of manufacturing an axle tube housing for a differential assembly, the method comprising:

heating a spindle segment of a one-piece tubular blank;

inserting a mandrel within said one-piece tubular blank;

applying a compressing force to said spindle segment of said one-piece tubular blank to closely conform with at least one of a forging die and said mandrel;

forming said spindle segment of said one-piece tubular blank using at least said forging die; and

reducing a wall thickness of a first portion of a carrier segment of said one-piece tubular blank.

13. The method according to Claim 12, further comprising:

at least partially removing said mandrel from within said one-piece tubular blank; and

reducing an outer diameter of a second portion of said carrier segment such that a wall thickness of said second portion of said carrier segment is greater than said wall thickness of said first portion of said carrier segment.

14. The method according to Claim 13 wherein said reducing said outer diameter of said second portion of said carrier segment includes cold forming.

15. The method according to Claim 12, further comprising:

mounting a pre-faced and drilled plate to said one-piece tubular blank in a predetermined position.

16. The method according to Claim 15 wherein said step of mounting said pre-faced and drilled plate to said one-piece tubular blank in said predetermined position includes fusion welding said pre-faced and drilled plate to said one-piece tubular blank.

17. An axle tube housing comprising:

a spindle segment; and

a carrier segment integrally formed with said spindle segment, said carrier segment and said spindle segment having substantially homogenous grain structure.

18. The axle tube housing according to Claim 17 wherein said spindle segment has varying wall thicknesses.

19. The axle tube housing according to Claim 17 wherein said carrier segment has varying wall thicknesses.